ABSTRACT OF THE DISCLOSURE

In a seismic survey, idealized subsurface illumination is generated using idealized survey data. Then, the following three steps are performed during each of a sequence of time intervals during the seismic survey. First, an incremental portion of actual survey data is collected, using data acquisition equipment at a data acquisition location. Second, the incremental portion of actual survey data is communicated from the data acquisition location to a data processing location. Third, an incremental portion of actual subsurface illumination is generated using the incremental portions of actual survey data, to incrementally generate actual subsurface illumination at the data processing location. It is determined if additional data acquisition is desirable by comparison of the idealized subsurface illumination and the actual subsurface illumination, in the data processing location. Then, any desirable additional data acquisition is performed in the data acquisition location before the data acquisition equipment leaves the data acquisition location.